

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

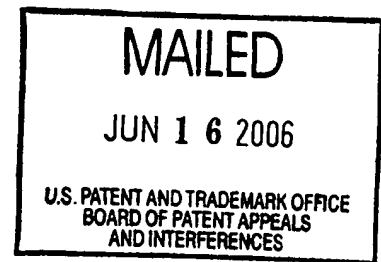
UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MARK R. STEVENS
and WILLIAM B. CULBERTSON

Appeal No. 2006-1642
Application No. 09/987,918

ON BRIEF



Before KRASS, JERRY SMITH, and BARRY, Administrative Patent Judges.

JERRY SMITH, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal under 35 U.S.C. § 134 from the examiner's rejection of claims 1-11, 14, 15, 17, and 19. Claims 12, 13, 16, 18, and 20 have been indicated by the examiner as containing allowable subject matter.

The disclosed invention pertains to a method for measuring color consistency between corresponding portions of two-dimensional images that are used to create three-dimensional models of scenes or objects. The method includes selecting first and second subsets of image partitions from first and

second sets of image partitions based upon criteria related to a three-dimensional object region. Each image partition in each subset is assigned a color value and then placed in a first and second series of histogram subdivisions respectively based on the color value of each image partition. The first and second series of histogram subdivisions are compared and the region is processed based on whether the first and second series of histogram subdivisions are similar.

Representative claim 1 is reproduced as follows:

1. A method of measuring color consistency comprising:

obtaining a first two-dimensional image and a second two-dimensional image of an object;

subdividing the first image into a first set of image partitions and the second image into a second set of image partitions, each image partition having a color;

selecting a first subset of image partitions in the first set of image partitions and a second subset of image partitions in the second set of image partitions based upon a criteria related to a three-dimensional region of the object;

assigning each image partition in the first subset and each image partition in the second subset a color value corresponding to the color of the image partition;

placing each image partition in the first subset in one of a first series of histogram subdivisions and each image partition in the second subset in one of a second series of histogram subdivisions based on the color value of each image partition;

comparing the first series of histogram subdivisions to the second series of histogram subdivisions; and

processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity.

The examiner relies on the following references:

| | | |
|--------------------------|-----------|---|
| Krishnamachari | 6,721,449 | Apr. 13, 2004 (filed Jul. 6, 1998) |
| Kaufman et al. (Kaufman) | 4,985,856 | Jan. 15, 1991 |
| Syeda-Mahmood | 6,691,126 | Feb. 10, 2004 (filed Jun. 14, 2000) |
| Kim et al. (Kim) | 6,711,288 | Mar. 23, 2004 (effective filing date of Jan. 29, 1999) |

Moghaddam, Baback, et al., "Image Retrieval With Local and Spatial Queries," IEEE Proc. of the 2000 Int'l Conf. on Image Processing, Vol. 2, p. 542-45, Sept. 2000.

Swain, Michael J., "Color Indexing," Int'l J. of Comp. Vision, Vol. 7, No. 1, p. 11-28, 1991.

The following rejections are on appeal before us:

1. Claims 1-3, 5-11, and 19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Krishnamachari in view of Moghaddam.

2. Claim 4 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Krishnamachari in view of Moghaddam and further in view of Kaufman.

3. Claim 14 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Krishnamachari in view of Moghaddam and further in view of Swain.

4. Claim 15 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Krishnamachari in view of Moghaddam and further in view of Syeda-Mahmood.

5. Claim 17 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Krishnamachari in view of Moghaddam and further in view of Kim.

Rather than repeat the arguments of appellants or the examiner, we make reference to the briefs and the answer for the respective details thereof.

OPINION

We have carefully considered the subject matter on appeal, the rejections advanced by the examiner and the evidence of obviousness relied upon by the examiner as support for the rejections. We have, likewise, reviewed and taken into consideration, in reaching our decision, appellants' arguments set forth in the briefs along with the examiner's rationale in support of the rejections and arguments in rebuttal set forth in the examiner's answer.

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would have suggested to one of ordinary skill in the art the obviousness of the invention as set forth in claims 1-11, 14, 15, and 17. We reach the opposite conclusion, however, with respect to claim 19. Accordingly, we affirm-in-part.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of

obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966). The examiner must articulate reasons for the examiner's decision. In re Lee, 277 F.3d 1338, 1342, 61 USPQ2d 1430, 1434 (Fed. Cir. 2002). In particular, the examiner must show that there is a teaching, motivation, or suggestion of a motivation to combine references relied on as evidence of obviousness. Id. at 1343. The examiner cannot simply reach conclusions based on the examiner's own understanding or experience - or on his or her assessment of what would be basic knowledge or common sense. Rather, the examiner must point to some concrete evidence in the record in support of these findings. In re Zurko, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001). Thus the examiner must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the examiner's conclusion. However, a suggestion, teaching, or motivation to combine the relevant prior art teachings does not have to be found explicitly in the prior art, as the teaching, motivation, or suggestion may be implicit from the prior art as a whole, rather than expressly stated in the references. The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art. In re Kahn, 441 F.3d 977, 987-88, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006) citing In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313 (Fed. Cir.

2000). See also In re Thrift, 298 F. 3d 1357, 1363, 63 USPQ2d 2002, 2008 (Fed. Cir. 2002). These showings by the examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). If that burden is met, the burden then shifts to the applicant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. See Id.; In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976). Only those arguments actually made by appellants have been considered in this decision. Arguments which appellants could have made but chose not to make in the briefs have not been considered and are deemed to be waived [see 37 CFR § 41.37(c)(1)(vii)(2004)].

Regarding independent claims 1 and 19, the examiner's rejection essentially finds that Krishnamachari teaches every claimed feature except for (1) selecting the first and second subsets of image partitions based upon a criteria related to a three-dimensional region of the object, and (2) processing the region based on whether the pair of series of histogram subdivisions is similar [answer, pages 3-5]. The examiner cites Moghaddam as teaching a content-based image retrieval system that enables the user to select regions of interest corresponding to three-dimensional objects in a scene. According to the examiner, after the system of Moghaddam processes the regions of interest

using local histogram measures, the regions' histograms are then matched to histograms of reference images to find a matching image [answer, page 5]. The examiner finds that, in view of Moghaddam, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Krishnamachari to select subsets of image partitions based upon criteria related to a three-dimensional region of the object and process the region based upon whether the series of histogram subdivisions is similar [answer, page 5]. The examiner notes that such a system provides a more powerful search engine and allows the user to specify arbitrary regions of objects to be retrieved [answer, page 6].

Appellants first argue that Krishnamachari does not teach or suggest obtaining a first two-dimensional image and a second two-dimensional image of an object (i.e., the same object) as claimed [emphasis added]. Appellants note that Krishnamachari compares plural reference images to a target image to provide a list of images in a database that are most similar to the target image. According to appellants, Krishnamachari does not teach nor suggest that the target image and any of the retrieved images are of the same object. Rather, Krishnamachari merely retrieves similar images from the database [brief, page 5; reply brief, page 1; emphasis added].

The examiner responds that although Krishnamachari does not expressly state that the target image is that of the same object as any of the database images, the limitation is nonetheless implicit in Krishnamachari's disclosure given the purpose of Krishnamachari's system to retrieve the most similar images to a target image [answer, pages 11 and 12]. The examiner argues that the target

image and database image could be the same and, in that case, Krishnamachari's system would report that the target and database images are substantially similar [answer, page 11].

We agree with the examiner. Krishnamachari's image comparison system determines the degree of similarity between target and reference images based on the number of occurrences of each associated color in corresponding partitions as well as the color difference between these associated colors [Krishnamachari, col. 2, line 56 – col. 3, line 4]. Although Krishnamachari's system finds the most similar images to the target image, we see no reason why Krishnamachari's system would not function as disclosed in the case where the target and references images are identical (e.g., fingerprints). Retrieving an identical image to the target image is the epitome of retrieving the most similar image. Krishnamachari's image retrieval system simply does not preclude retrieving an image identical to the target image. If the identical image is stored in the database, Krishnamachari's system will retrieve it.

Appellants next argue that Krishnamachari does not teach nor suggest processing the region based on whether the first series of histogram subdivisions and the second series of subdivisions have a similarity as claimed [brief, page 6]. Appellants note that the similarity between the first and second series of histogram subdivisions ultimately determines whether the region is included in the three-dimensional model [brief, page 7]. Appellants argue that once a similar image is found in Krishnamachari's system, the analysis is complete; the image is not further processed [reply brief, pages 1 and 2]. The examiner responds that

Krishnamachari was not cited for this limitation, but rather Moghaddam was cited for “processing” certain regions of interest of an image in lieu of an entire image [answer, page 12]. The examiner argues that the scope of claim 1 does not preclude Moghaddam who “processes” the region of interest by retrieving and displaying a matching region of interest [answer, pages 13 and 14]. Specifically, the examiner notes that the claim does not specify how the image is processed that would differentiate the claim as a method involving three-dimensional modeling from a method involving image retrieval [answer, page 13].

We agree with the examiner with respect to claim 1. The examiner has construed the limitation “processing the [three-dimensional] region” of the object as corresponding to retrieving and displaying the image’s matching region of interest as taught by Moghaddam [answer, pages 13 and 14]. We find this interpretation reasonable given the limitation’s broadest reasonable interpretation, and appellants have not persuasively rebutted the examiner’s construction. As the examiner indicates, claim 1 does not limit the processing step to a three-dimensional modeling process, but merely broadly recites that the image’s region is “process[ed].” In our view, Moghaddam’s image retrieval system that retrieves and displays regions representing three-dimensional aspects of images reasonably reads on the “processing” step. Moreover, ample motivation exists to combine Moghaddam with Krishnamachari essentially for the reasons stated by the examiner.

We disagree with the examiner, however, with respect to independent claim 19. In short, the examiner’s arguments with respect to claim 1 are not

commensurate with the scope of claim 19. Claim 19 expressly recites in the last two lines that the method “includ[es] the region in a three-dimensional model of the object if the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity.” Unlike claim 1, claim 19 recites further details regarding processing the region – namely including the region in a three-dimensional model of the object if the first and second series of histogram subdivisions are similar.¹

Although appellants did not argue this issue with particularity, the cited prior art’s failure to teach or suggest the above limitation in claim 19 was nevertheless raised on page 7 of the brief. The examiner has not identified any teaching or suggestion in the cited prior art that pertains to three-dimensional modeling of objects, let alone including the object’s three-dimensional region in a three-dimensional model of the object if the first and second series of histogram subdivisions are similar as claimed. Nor can we find any reasonable teaching or suggestion to include the region in a three-dimensional model on this record. Although the examiner’s construction of the limitation calling for “processing the region” in claim 1 was reasonably suggested by Krishnamachari and Moghaddam as noted above, these references pertaining to image retrieval hardly teach or suggest three-dimensional modeling as claimed. We cannot say that no references exist that would suggest combining such a modeling technique with the cited prior art; we can say, however, that no such teaching

¹ The examiner appears to implicitly acknowledge this difference in claim scope by noting that claim 1 does not specify how the image is processed that would differentiate the claim as a method involving three-dimensional modeling from a method involving image retrieval [answer, page 13].

exists on this record. Accordingly, we will not sustain the examiner's rejection of claim 19.

Appellants also argue that Moghaddam does not disclose selecting a first subset of image partitions in the first set of image partitions and a second subset of image partitions in the second set of image partitions based upon a criteria related to a three-dimensional region of the object as claimed [brief, page 9]. Appellants contend that Moghaddam teaches using spatial information to describe the relative spacing of regions of interest. According to appellants, such spatial information is based on two-dimensional characteristics—not three-dimensional characteristics as claimed [brief, page 9; reply brief, page 2]. The examiner responds that although Moghaddam uses two-dimensional spatial information in selecting regions of interest, the regions of interest are nevertheless related to three-dimensional object regions as shown in Fig. 1 and therefore fully meet the claimed limitation [answer, page 14].

We agree with the examiner. Although the image in Fig. 1 of Moghaddam is a two-dimensional image, the image nonetheless represents three-dimensional regions. As the examiner indicates, regions are selected based upon the relative positioning of the dog and archway in Fig. 1. We agree that such positioning is reasonably considered criteria related to the three-dimensional object regions within the image given the limitation's broadest reasonable interpretation.

Although appellants nominally argue the rejection of dependent claims 4, 14, 15, and 17 separately [brief, pages 10-16], the arguments presented do not separately argue with particularity the limitations of the dependent claims, but are

essentially the same arguments we considered above with respect to claim 1. Since the argued limitations of claims 4, 14, 15, and 17 are similar to those of claim 1, we sustain the rejection of these claims for the same reasons discussed above with respect to claim 1. That is, we find that the examiner has established at least a prima facie case of obviousness of claims 4, 14, 15, and 17 that appellants have not persuasively rebutted.

Furthermore, the examiner has (1) pointed out the teachings of Krishnamachari and Moghaddam, (2) pointed out the perceived differences between Krishnamachari and Moghaddam and the claimed invention, and (3) reasonably indicated how and why Krishnamachari and Moghaddam would have been modified to arrive at the claimed invention. Once the examiner has satisfied the burden of presenting a prima facie case of obviousness, the burden then shifts to appellants to present evidence or arguments that persuasively rebut the examiner's prima facie case. As noted above, appellants did not persuasively rebut the examiner's prima facie case of obviousness for claims 4, 14, 15, and 17. The rejection is therefore sustained.

In summary, we have sustained the examiner's rejection with respect to claims 1-11, 14, 15, and 17. We have not sustained, however, the examiner's rejection with respect to claim 19. Therefore, the decision of the examiner rejecting claims 1-11, 14, 15, 17, and 19 is affirmed-in-part.

claim 1, we sustain the rejection of these claims for the same reasons discussed above with respect to claim 1. That is, we find that the examiner has established at least a prima facie case of obviousness of claims 4, 14, 15, and 17 that appellants have not persuasively rebutted.

Furthermore, the examiner has (1) pointed out the teachings of Krishnamachari and Moghaddam, (2) pointed out the perceived differences between Krishnamachari and Moghaddam and the claimed invention, and (3) reasonably indicated how and why Krishnamachari and Moghaddam would have been modified to arrive at the claimed invention. Once the examiner has satisfied the burden of presenting a prima facie case of obviousness, the burden then shifts to appellants to present evidence or arguments that persuasively rebut the examiner's prima facie case. As noted above, appellants did not persuasively rebut the examiner's prima facie case of obviousness for claims 4, 14, 15, and 17. The rejection is therefore sustained.

In summary, we have sustained the examiner's rejection with respect to claims 1-11, 14, 15, and 17. We have not sustained, however, the examiner's rejection with respect to claim 19. Therefore, the decision of the examiner rejecting claims 1-11, 14, 15, 17, and 19 is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv).


AFFIRMED-IN-PART

Encl. 1

ERROL A. KRASS
Administrative Patent Judge

Jerry Smith
JERRY SMITH

JERRY SMITH
Administrative Patent Judge


LANCE LEONARD BARRY
Administrative Patent Judge

~~LANCE LEONARD BARRY~~
~~Administrative Patent Judge~~

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HEWLETT-PACKARD COMPANY
INTELLECTUAL PROPERTY ADMINISTRATION
P.O. BOX 272400
FORT COLLINS, CO 80527-2400